

Case 3164

***Kaloterme*s Hagen, 1853 (Insecta, Isoptera): proposed designation of *Termes flavicollis* Fabricius, 1793 as the type species**

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Abstract. The purpose of this application is to conserve the current usage of the generic name *Kaloterme*s Hagen, 1853 for a common group of living drywood termites, with Middle Eocene fossil representatives. Wasmann (1897) designated *Termes flavicollis* Fabricius, 1793 as type species of *Kaloterme*s Hagen, 1853 (an unjustified emendation and hence a junior objective synonym of *Kaloterme*s), but this designation was invalid since it was not an originally included species in *Kaloterme*s. The first valid type species designation for *Kaloterme*s was by Banks (1920) who designated *Termes berendtii* Pictet, 1856, but this species had been designated by von Rosen (1913) as type species of *Proelectrotermes* von Rosen, 1913, a genus currently in use for a Middle Eocene species. To conserve current usage of *Kaloterme*s and *Proelectrotermes* it is proposed that *T. flavicollis* be designated as type species of *Kaloterme*s.

Keywords. Nomenclature; taxonomy; Isoptera; *Kaloterme*s; *Proelectrotermes*; KALOTERMITIDAE; termites; Middle Eocene; Recent.

1. Hagen (1853, pp. 479–480) named the termite genus *Kaloterme*s and provided a fairly detailed description of the imago and soldier castes, nymphs, and nest excavations for the group. Even though he did not include any named species the name *Kaloterme*s is available from 1853. The generic description included information on a variety of castes and biological traits, and Hagen probably had before him a living species from which to draw such character information.

2. Hagen (1854, p. 222) again mentioned *Kaloterme*s and for the first time included specific names for two Middle Eocene species, *Kaloterme*s *affinis* Hagen and *K. berendtii* Pictet, but these were not described and are nomina nuda. These two specific names were made available two years later when Hagen (in Pictet & Hagen, 1856) published descriptions and illustrations of *Termes berendtii* which he attributed to Pictet (p. 49) and *T. affinis* Hagen (p. 50) and included both in his 'gruppe' *Kaloterme*s. It has commonly been believed that Hagen also included *T. flavicollis* Fabricius, 1793 (p. 91, published as *T. flavicolle* but changed to *T. flavicollis* in accordance with Article 34.2 of the Code) in *Kaloterme*s at this time (e.g., Krishna,

1961; Watson, Miller & Abbey, 1998). However, Hagen did not explicitly assign *T. flavicollis* to *Kaloterмес* but merely provided comparative comments distinguishing *T. flavicollis* from the fossil species. Hagen made similar comparisons to other living species that were also not explicitly included in *Kaloterмес*. Only the fossils *T. berendtii* and *T. affinis* were explicitly included in *Kaloterмес*, and these are thus the only originally included species (Article 67.2.2). Both fossils were (and still are) known only on the basis of the imago caste and could not have provided Hagen with the character information from the soldier caste, nymphs, and nesting biology upon which he (Hagen, 1853) had established the genus.

3. Hagen (1858, pp. 32–33) emended the spelling of the genus to *Caloterмес*, noting *Kaloterмес* as a synonym; he expanded the definition of the genus, listing 20 species among which were both fossil species from his 1854 and 1856 papers as well as *T. flavicollis*. *Caloterмес* Hagen, 1858 is an unjustified emendation (Article 33.2) and an available name, but a junior objective synonym of *Kaloterмес*.

4. Wasmann (1897, p. 150), using Hagen's emended spelling, designated *T. flavicollis* as type species of *Caloterмес*; however this designation was not valid (Article 67.8.1) since *T. flavicollis* was not an originally included species in *Kaloterмес*, the senior objective synonym of *Caloterмес*.

5. Von Rosen (1913, p. 331), in a work summarizing the known fossil termites, described two new subgenera of *Caloterмес* for Pictet & Hagen's (1856) fossil species: *Proelectrotermes* with *T. berendtii* as type species by original designation and monotypy, and *Electrotermes* with *T. affinis* as type species by original designation.

6. Banks (in Banks & Snyder, 1920, p. 9), in a revision of Nearctic termites, designated *T. berendtii* Pictet as type species for *Kaloterмес* but continued to include in the genus the living drywood termite species related to *T. flavicollis*. This type species designation is valid since *T. berendtii* was an originally included species in *Kaloterмес* as of 1856. *T. berendtii* also becomes the type species of *Caloterмес*.

7. Snyder (1949, p. 11), in a catalog of termite species of the world, considered *Caloterмес* to have been an unjustified emendation of *Kaloterмес* and listed *T. flavicollis* as the type species for *Kaloterмес*, citing Wasmann (1897) for the designation.

8. In the first half of the 20th century both *Kaloterмес* and *Caloterмес* were in common usage for the same group of living drywood termites. Examples of uses of *Caloterмес* include Desneux (1904), Silvestri (1901, 1934), Holmgren (1910), Sjöstedt (1907, 1926), and Grassé (1949), while uses of *Kaloterмес* include Banks & Snyder (1920), Snyder (1925, 1935, 1949), Emerson (1928, 1942, 1955, 1969), Hare (1937), Coaton (1949), Ahmad (1950), Stroud (1953), and Weidner (1955).

9. Krishna (1961, pp. 331–332), in a generic revision of the drywood termite family KALOTERMITIDAE, adopted the name *Kaloterмес*, with *T. flavicollis* as type species on the grounds that Hagen (1853) based his definition on a living termite species the description of which fits *T. flavicollis*.

10. Subsequent to Krishna (1961) all authors referring to drywood termites related to *T. flavicollis* have used the name *Kaloterмес* Hagen with *T. flavicollis* as type species (e.g., Miller, 1969; Weidner, 1970; Spear, 1970; Harris, 1971; Noirot & Noirot-Timotheé, 1972; Becker, 1973; Gay, 1977; Roonwal & Chhotani, 1989; Watson & Gay, 1991; Constantino, 1998; Watson, Miller & Abbey, 1998). *Caloterмес* Hagen, 1858 has universally and correctly been cited as a junior objective

synonym and an unjustified emendation. *Proelectrotermes* is formally a junior objective synonym of *Kalotermes* following Banks's (1920) type species designation of *T. berendtii* Pictet for *Kalotermes*, even though *Proelectrotermes* has been universally treated as the name for the monotypic fossil genus based on *T. berendtii* for more than 45 years.

11. Presently involved in a new catalogue of living and fossil species for the world and attempting to stabilize the nomenclature of termites, we propose that all type species designations for *Kalotermes* be set aside and *T. flavicollis* be designated as the type species for *Kalotermes*, thereby conserving the current usage of the generic names *Kalotermes* and *Proelectrotermes*.

12. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to set aside all previous fixations of type species for the nominal genus *Kalotermes* Hagen, 1853 and to designate *Termes flavicollis* Fabricius, 1793 as type species;
- (2) to place on the Official List of Generic Names in Zoology the following names:
 - (a) *Kalotermes* Hagen, 1853 (gender: masculine), type species by designation in (1) above *Termes flavicollis* Fabricius, 1793;
 - (b) *Proelectrotermes* von Rosen, 1913 (gender: masculine), type species by original designation and monotypy *Termes berendtii* Pictet, 1856;
- (3) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *flavicollis* Fabricius, 1793, as published in the binomen *Termes flavicolle* (specific name of the type species of *Kalotermes* Hagen, 1853);
 - (b) *berendtii* Pictet, 1856, as published in the binomen *Termes berendtii* (specific name of the type species of *Proelectrotermes* von Rosen, 1913);
- (4) to place on the Official Index of Rejected and Invalid Generic Names in Zoology the name *Calotermes* Hagen, 1858 (a junior objective synonym of *Kalotermes* Hagen, 1853).

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References

- Ahmad, M. 1950. The phylogeny of termite genera based on imago-worker mandibles. *Bulletin of the American Museum of Natural History*, **95**: 37–86.
- Banks, N. & Snyder, T.E. 1920. A revision of the Nearctic termites, with notes on biology and geographic distribution. *Bulletin of the United States National Museum*, **108**: 1–228.
- Becker, G. 1973. Zur Prüfung des chemischen Schutzes von Sperrholz gegen Termiten. *Material und Organismen*, **8**: 215–231.
- Coaton, W.G.H. 1949. Notes on some South African species of the families Hodotermitidae and Kalotermitidae. *Journal of the Entomological Society of South Africa*, **12**: 13–77.
- Constantino, R. 1998. Catalog of the living termites of the New World (Insecta: Isoptera). *Arquivos de Zoologia, São Paulo*, **35**: 135–231.
- Desneux, J. 1904. A propos de la phylogénie des Termitides. *Annales de la Société Entomologique de Belgique*, **48**: 278–286.
- Emerson, A.E. 1928. Termites of the Belgian Congo and the Cameroon. *Bulletin of the American Museum of Natural History*, **57**: 401–574.

- Emerson, A.E.** 1942. The relations of a relict South African termite (Isoptera, Hodotermitidae, *Stolotermes*). *American Museum Novitates*, **1187**: 1–12.
- Emerson, A.E.** 1955. Geographical origins and dispersions of termite genera. *Fieldiana: Zoology*, **37**: 465–521.
- Emerson, A.E.** 1969. A revision of the Tertiary fossil species of the Kalotermitidae (Isoptera). *American Museum Novitates*, **2359**: 1–57.
- Fabricius, J.C.** 1793. *Entomologia Systematica Emendata et Aucta, Secundum Classes, Ordines, Genera, Species, Adjectis Synonymis, Locis, Observationibus, Descriptionibus*, vol. 2. viii, 519 pp. Proft, Hafniae.
- Gay, F.J.** 1977. A new species of *Kalotermes* Hagen (Isoptera: Kalotermitidae) from tropical Queensland. *Journal of the Australian Entomological Society*, **16**: 221–224.
- Grassé, P.-P.** 1949. *Traité de Zoologie (Anatomie, Systématique, Biologie)*, vol. 9, Insectes. 1117 pp. Masson, Paris.
- Hagen, H.** 1853. Hr. Peters Berichtete über die von ihm gesammelten und von Hrn. Dr. Hermann Hagen bearbeiten Neuropteren aus Mossambique. *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*, **18**: 479–484.
- Hagen, H.** 1854. Ueber die Neuropteren der Bernsteinfauna. *Verhandlungen der Zoologisch-Botanischen Vereins in Wien*, **4**: 221–232.
- Hagen, H.** 1858. Monographie der Termiten. *Linnaea Entomologica*, **12**: 1–342.
- Hare, L.** 1937. Termite phylogeny as evidenced by soldier mandible development. *Annals of the Entomological Society of America*, **30**: 459–486.
- Harris, W.V.** 1971. *Termites: their recognition and control*. xiii, 186 pp. Longmans, London.
- Holmgren, N.** 1910. Das System der Termiten. *Zoologischer Anzeiger*, **35**: 284–286.
- Krishna, K.** 1961. A generic revision and phylogenetic study of the family Kalotermitidae (Isoptera). *Bulletin of the American Museum of Natural History*, **122**: 303–408.
- Miller, E.M.** 1969. Caste differentiation in the lower termites. Pp. 283–310 in Krishna, K. & Weesner, F.M. (Eds.), *Biology of termites*, vol. 1. xiii, 598 pp. Academic Press, New York.
- Noirot, C. & Noirot-Timotheé, C.** 1972. Structure fine de la bordure en brosse de l'intestin moyen chez les insectes. *Journal de Microscopie*, **13**: 85–96.
- Pictet, F.J. & Hagen, H.** 1856. Die im Bernstein befindlichen Neuropteren der Vorwelt. Pp. 41–126 in Berendt, G.C. (Ed.), *Die im Bernstein befindlichen organischen Reste der Vorwelt*, vol. 2. [2], 126 pp.
- Roonwal, M.L. & Chhotani, O.B.** 1989. *Fauna of India and Adjacent Countries: Isoptera (Termites)*, vol. 1. [8], viii, 672 pp. Zoological Survey of India, Calcutta.
- Rosen, K. von.** 1913. Die fossilen Termiten: Eine kurze Zusammenfassung der bis jetzt bekannten Funde. *Transactions of the Second International Congress of Entomology, Oxford 1912*, **2**: 318–335, 6 pls.
- Silvestri, F.** 1901. Nota preliminare sui Termitidi sud-americani. *Bollettino dei Musei di Zoologia ed Anatomia Comparata della Reale Università di Torino*, **16**(389): 1–8.
- Silvestri, F.** 1934. *Compendio di Entomologia Applicata (Agraria-Forestale-Medica-Veterinaria)*, parte speciale. 448 pp. Tipografia Bellavista, Portici.
- Sjöstedt, Y.** 1907. *Wissenschaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru und den Umgebenden Massaistepfen Deutsch-Ostafrika 1905–1906 unter Leitung von Prof. Dr. Yugve Sjöstedt: Herausgegeben von der Königliche Schwedischen Akademie der Wissenschaften*, 15. *Corrodentia, 1. Termitidae*, vol. 3. 37 pp. Almqvist & Wiksells, Uppsala.
- Sjöstedt, Y.** 1926. Revision der Termiten Afrikas: 3. Monographie. *Kungliga Svenska Vetenskapsakademiens Handlingar*, (3)3: 1–419.
- Snyder, T.E.** 1925. Notes on fossil termites with particular reference to Florissant, Colorado. *Proceedings of the Biological Society of Washington*, **38**: 149–166.
- Snyder, T.E.** 1935. *Our Enemy, the Termite*. xii, 196 pp. Comstock Publishing Company, Ithaca.
- Snyder, T.E.** 1949. Catalog of the termites (Isoptera) of the world. *Smithsonian Miscellaneous Collections*, **112**: 1–490.

- Spear, P.J.** 1970. Principles of Termite Control. Pp. 577–604 in Krishna, K. & Weesner, F.M. (Eds.), *Biology of Termites*, vol. 2. xiv, 643 pp. Academic Press, New York.
- Stroud, C.P.** 1953. An application of factor analysis to the systematics of *Kalotermes*. *Systematic Zoology*, **2**: 76–92.
- Wasmann, E.** 1897. Termiten von Madagaskar und Ostafrika. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, **21**: 137–182.
- Watson, J.A.L. & Gay, F.J.** 1991. Isoptera (Termites). Pp. 330–347 in Naumann, I.D. & Carne, P. B. (Eds.), *The Insects of Australia: A Textbook for Students and Research Workers*. Ed. 2, vol. 1. xvi, 1, 542 pp. Cornell University Press, Ithaca.
- Watson, J.A.L., Miller, L.R. & Abbey, H.M.** 1998. Isoptera. Pp. 163–250 in Houston, W.W.K. & Wells, A. (Eds.), *Zoological catalogue of Australia*, vol. 23: *Archaeognatha, Zygentoma, Blattodea, Isoptera, Mantodea, Dermaptera, Phasmatodea, Embioptera, Zoraptera*. xiii, 464 pp. CSIRO Publishing, Melbourne.
- Weidner, H.** 1955. Körperbau, Systematik und Verbreitung der Termiten. Pp. 5–81 in Schmidt, H. (Ed.), *Die Termiten: Ihre Erkennungsmerkmale und wirtschaftliche Bedeutung*. 309 pp. Geest & Portig, Leipzig.
- Weidner, H.** 1970. Isoptera (Termiten). *Handbuch der Zoologie*, (14)**4**: 1–147.
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